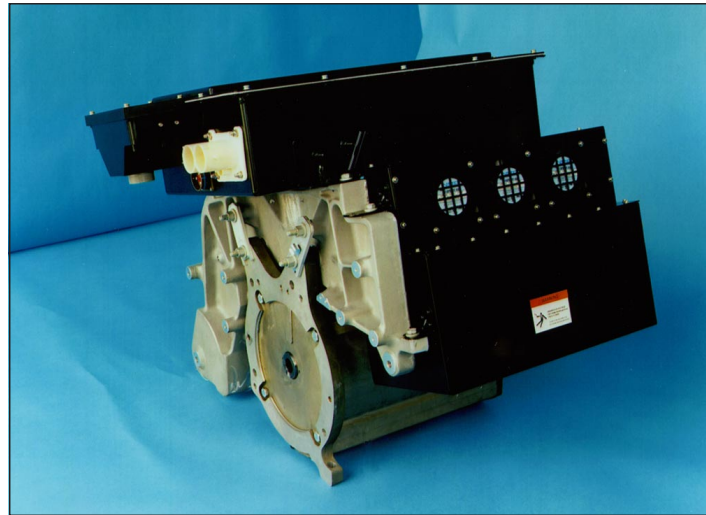




FIRE RESISTANT HYDRAULIC FLUID SELECTED FOR USE IN ELECTRIC VEHICLE PROGRAM

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Payoff

The selection of the hydraulic fluid, MIL-H-87257, for use in Northrop Grumman's electric vehicle development program demonstrates its commercial application potential as a coolant and lubricant for motor components. Its fire resistant nature, combined with good lubricity and lower viscosity at lower temperatures, makes MIL-H-87257 an exceptionally good candidate for future military and commercial systems.

Accomplishment

Research scientists and engineers at the Materials and Manufacturing Directorate transferred a fire resistant hydraulic fluid to Northrop Grumman for application in the development of an electric vehicle. The hydraulic fluid, MIL-H-87257, developed to improve operational safety for the B-1B and other aircraft, outperformed the company's coolant/lubricant, MIL-H-7808, previously used in the vehicle's drive train.

Background

When engineers at Northrop Grumman found that the viscosity (degree to which a fluid resists flow under applied force) of the coolant/lubricant being used in their electric vehicle's drive train was too high to meet the system's low temperature start-up requirements, alternative fluids were considered. The Directorate's Nonstructural Materials Branch, serving as technical consultants, suggested two possible alternatives that included MIL-H-87257, a commercially available polyalphaolefin, synthetic, hydrocarbon-based fire resistant hydraulic fluid originally developed for use on the B-1B aircraft. After selecting MIL-H-87257 as a possible replacement for MIL-L-7808, Grumman initiated an extensive 18 month test program to examine the fluid's performance in various types of electrical motors. Their test program examined all the important material compatibility questions that included the fluids compatibility with the motors wiring insulation and seals. A primary concern was how well the fluid would perform in open motor systems as opposed to confined, protected environments typical of aircraft flight control systems. Long-term tests at higher temperature ranges were conducted to determine whether volatility and oxidative stability were major issues. In the case of MIL-H-87257, they were not. The tests showed MIL-H-87257 to have lubricity and viscosity at low temperatures that exceeded design and performance requirements for the electric vehicle's drive train.